Predicting future speeding behaviour: The appeal of positive emotional appeals for high risk road users

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Abstract

Males are more likely to be involved in road-related trauma and to engage in risky driving behaviours such as speeding. Advertising campaigns attempting to motivate behavioural change among males often rely upon negative, fear-based emotional appeals. However, evidence is mixed for the effectiveness of fear appeals and there is limited evidence for the effectiveness of alternative emotion-based approaches, such as positive emotional appeals, which incorporate humour or pride. The current study examined the impact of negative and positive emotional messages on self-reported speeding behaviour. For comparative purposes, the results obtained for male, as well as female drivers, are reported. Participants (N = 205) completed an internet-based survey in which their past (pre-exposure) speeding behaviour was assessed before exposure to either a positive or negative emotion-based message. Immediately after exposure, the extent of message acceptance was assessed. One month later, participants were asked to report their speeding behaviour during the previous 4 weeks. Hierarchical regressions examined the extent that message acceptance predicted subsequent self-reported behaviour over and above the impact of participants' past speeding behaviour. The results revealed that message acceptance reported by males after exposure to positive emotional appeals was a more important predictor of subsequent speeding behaviour than their past speeding behaviour. In contrast, the results reported for those exposed to negative emotional appeals indicated that such appeals may have limited impact on males' speeding behaviour with past behaviour emerging as the only significant predictor. Overall, the results highlight the potential utility of positive emotional appeals for modifying the behaviour of male road users.

Keywords

Emotional appeals; gender; message acceptance; past behaviour; behaviour change

Introduction

Speeding is regarded as the most frequent and widespread form of traffic violation amongst drivers (Aberg, Larsen, Glad, & Beilinsoon, 1997; Conner et al., 2007). Although commonly engaged in by drivers, it is now well-established that speeding represents one of the most significant contributing factors to crash frequency and severity (Conner et al., 2007). A substantial body of literature has amassed in the attempt to understand a range of factors that underpin speeding behaviour. Broadly, these factors relate to personal, social, legal, and situational characteristics (Fleiter & Watson, 2006). Understanding such factors is regarded the most effective means of developing more targeted countermeasures to reduce driver speeding (Elliott, Armitage, & Baughan, 2003). While it is beyond the scope of the current paper to provide a detailed review of factors contributing to speeding, two key personal or driver-related characteristics which have been associated with greater speeding behaviour are

(i) having engaged in speeding behaviour in the past (i.e., past behaviour) and (ii) gender (i.e., being male).

Past behaviour and habit formation

Psychological literature attests to the important role of past behaviour in determining what an individual is likely to do in the future (Ouelette & Wood, 1998). According to Conner et al. (2007), the view is not that past behaviour causes future behaviour but, rather, that the frequent performance of a particular behaviour may lead it to become more habitual and, thus, make future engagement in the same behaviour more likely. The potential for speeding behaviour to come under the control of more habitual processes has been suggested elsewhere (e.g., Conner et al., 2007; Fleiter, Lennon, & Watson, 2007). For instance, Fleiter et al. (2007) found that regular speeders reported a lack of awareness of, and attention paid to, posted speed limits and were more likely to base their speed choice on individual preference. This finding suggests that regular speeders do not monitor their speed in accordance with posted speeds on any particular trip but, rather, may drive at speeds at which they are comfortable and used to driving at.

Evidence derived from driving-related research has supported the important role of past behaviour on future behaviour. In relation to speeding specifically, research has attested to the important role of past (or prior) behaviour in influencing future speeding behaviour (Elliott et al., 2003). A recent study by DePelsmacker and Janssens (2007) concluded that past behaviour (also referred to by the authors as habit formation) represented a key factor influencing self-reported speeding behaviour. These authors concluded that habit formation was at least as important as intention when it comes to predicting speeding behaviour. The significance of this conclusion lies in the fact that according to the Theory of Planned Behaviour (TPB; Ajzen, 1991) the most important and proximal determinant of behaviour is intentions. Moreover, researchers have highlighted the important role of past behaviour in determining subsequent behaviour by suggesting that it may help to explain the 'gap' between attitudes and behaviour (Rothengatter, 1993). Arguably, speeding behaviour represents a notable example of the gap between attitudes and behaviour. Although recent community surveys (e.g., Mitchell-Taverner, 2002) as well as empirical studies (e.g., Fleiter & Watson, 2006) have revealed the majority of respondents believe that speeding is dangerous and wrong, many of the drivers continue to engage in speeding. This evidence suggests that efforts to reduce speeding behaviour may need to be directed at breaking the habit of speeding rather than focus specifically on efforts to modify attitudes (Mann & Sullman, 2008). It follows, therefore, that interventions designed to reduce speeding may need to be examined in terms of their impact upon more proximal determinants of behaviour, namely intentions, rather than attitudes alone (Elliott et al., 2003).

Being male

Males, relative to females, are more likely to be involved in road trauma (ATSB, 2007). Also, males are more likely to report having engaged in risky driving behaviours such as speeding (Fleiter, Watson, Lennon, & Lewis, 2006; Harré, Field, & Kirkwood, 1996) and have been observed to engage in greater speeding behaviour (Wasielewski, 1984). Furthermore, males have been shown to score higher on a number of perceptual biases that would likely increase their tendency of engaging in risky behaviours (Harré, Foster, & O'Neill, 2005). For instance, males have been shown to regard themselves as "better" and more skillful drivers than their

peers compared with females (Harré et al., 2005) and as being less likely than females to be involved in a road crash as a result of risky driving (DeJoy, 1992).

Given the evidence above, it is not surprising that many roads safety messages often target male drivers (Tay, 2002; Tay & Ozanne, 2002). Typically, these messages are threat- or fear-based messages that threaten physical harm as a result of engaging in risky behaviours. However, despite being a common target group, a growing body of evidence suggests that males are not persuaded to modify their driving behaviour as a result of fear-based messages (Goldenbeld, Twisk, & Houwing, 2008; Lewis, Watson, & Tay, 2007). For instance, Lewis et al. (2007) found males' responses to fear-evoking anti-speeding and anti-drink driving messages were consistent with a third-person effect (see Davison, 1983). Specifically, males reported the messages as having greater influence on other drivers in general than themselves while females reported the opposite effect (i.e., the messages would have greater influence on themselves than on other drivers). This gender difference in third person perceptions also corresponded with the extent of intentional change reported (where intentional change represented message acceptance) with males reporting significantly less intentional change in response to the messages than females. A similar gender effect has been reported in response to fear-based anti-speeding messages in a more recent study (Goldenbeld et al. 2008). While fear-based messages appear to have limited impact upon males, empirical research has shown that messages that incorporate positive emotions such as humour may be more persuasive among males. This effect has been found for health messages addressing various issues including AIDS/HIV and sunscreen use (Conway & Dubé, 2002) as well as drink driving (Lewis, Watson, & White, in press).

A final note on message acceptance

In health persuasion literature, message effectivness is often measured in terms of the degree of attitudinal, intentional, and/or behavioural change achieved. Typically, and especially in relation to fear-based messages, message effectiveness is referred to as the extent of message acceptance. When operationalised, message acceptance is often assessed in terms of the degree to which individuals report an *intention* to adopt a message's recommendations. Thus, message acceptance represents the extent that a message is effective in persuading. This message acceptance terminology is adopted in the current paper.

The current study

The current study had two main aims: (i) to determine whether anti-speeding advertising messages influence speeding behaviour beyond the influence of past speeding behaviour; and (ii) to determine whether the type of emotional message (i.e., positive or negative) and the gender of the respondent influences the extent to which advertising messages are able to influence speeding behaviour over and above the influence of past speeding behaviour. It is predicted that, for males, positive emotional appeals will be more likely to impact upon future driving behaviour than negative emotional appeals. Specifically, it is hypothesised that for males:

Hypothesis 1a: Message acceptance reported in response to positive messages will significantly predict subsequent self-reported behaviour over and above past (pre-exposure) behaviour.

Hypothesis 1b: Message acceptance reported in response to negative messages will not predict subsequent self-reported behaviour over and above past (pre-exposure) behaviour.

In contrast, for females, the results predicted are opposite to those expected for males. Specifically,
Hypothesis 2a: Message acceptance reported in response to negative messages will significantly predict subsequent self-reported behaviour over and above past (pre-exposure) behaviour.
Hypothesis 2b: Message acceptance reported in response to positive messages will not predict subsequent self-reported behaviour over and above past (pre-exposure) behaviour.

Methods

Participants

All participants were holders of a current driver's licence. Participants completed the study via an on-line survey. The link to the survey was placed on the authors' research centre's homepage and emails inviting participation in the study were forwarded to student and staff lists of a large Australian university as well as staff of a multifaceted organization involved in many aspects of motoring (i.e., the Royal Automobile Club of Queensland [RACQ]). Additionally, a link to the survey was placed on the RACQ homepage to increase the likelihood of drivers finding the study.

To be included in the current study, participants were required to provide data at 2 points in time: Time 1 and Time 2. A total of 205 participants completed both phases. Of these, 139 were females, 65 were males, and 1 respondent did not specify. Ages of the participants ranged from 17 to 59 years (M = 30.89; SD = 10.63)[1]. At each phase, to enhance the response rate, participants were offered a ticket in a raffle to win one of six $AUS50 shopping vouchers.

Materials

Messages
Based on recommendations of a notable road safety advertising researcher (Elliott, 1987), audio-recorded messages voiced by a professional radio journalist, were prepared for the study. The design of the messages' emotional content was guided by an existing theoretical framework, the Rossiter-Percy motivational model (for further details of the framework, see Donovan & Henley, 2003). Of importance for the current study, this model identifies a role for emotion in persuasive messages and it distinguishes between appeals to more negative emotions, such as fear, and appeals to more positive emotions, such as humour. Table 1 details the four emotional appeals utilised in the current study.

[1] While attrition occurred between the two research phases (i.e., N = 551 at Phase 1 to N = 205 at Phase 2), a similar proportion of females participated in both data collection phases (i.e., 67.8%) as those who did not (i.e., 62.7%) suggesting that the overall constitution of the sample in regards to key demographic characteristics remained similar between the two data collection phases.

Table 1
Participants and emotional appeal types in the negative and positive emotional appeals conditions of the current study

Negative Emotion Appeals Condition	Positive Emotion Appeals Condition
Males *n* = 41 Females *n* = 63	Males *n* = 24 Females *n* = 76
1. Fear-based appeal	1. Pride-based appeal
2. Agitation-based appeal	2. Humour-based appeal

As Table 1 shows, to provide a more comprehensive test of positive and negative emotional appeals, two specific but different types of emotional appeals were utilised to represent both the negative and positive emotional appeals condition. Manipulation checks conducted on the current study's sample indicated that each message evoked emotions consistent with the researchers' expectations and evoked different emotions from the other messages. Table 1 also indicates that only a small sample of males was included in the positive emotion appeals condition. Unfortunately, the researchers had limited control of the sample sizes in each condition as it was contingent on the number of participants who agreed to participate in both phases of data collection. Post hoc calculations were thus conducted to determine the ability of this sample size to detect an effect. Calculations were based on: (i) one IV in each step of the model (see the Results section for further details of the regression analyses conducted); (ii) an alpha level of .05, (iii) and a power level of 0.80. The results indicated that a sample of approximately this size would be capable of detecting a large effect size (0.35).

Measures

The Time 1 survey was divided into pre-exposure measures (e.g., demographics and past (pre-exposure) self-reported speeding behaviour) and immediate post-exposure measures (e.g., intentions). Items used to assess speeding behaviour were adapted from previous studies (e.g., Conner et al., 2007; Fleiter & Watson, 2006). Three items assessed past self-reported speeding behaviour: participants were asked to report the extent that they had (i) exceeded the posted speed limit by less than 10km/hr, (ii) had driven at 10km/hr or more over the speed limit and (iii) had driven at 20km/hr or more over the speed limit. As noted previously and as is consistent with previous literature (e.g., Fleiter & Watson, 2006; Mitchell-Taverner, 2002), the latter two items were assessed in terms of speeding on both urban roads (i.e., 50 and 60km/hr roads) as well as on open roads/highways (i.e., 100 and 110km/hr roads). An overall measure of speeding behaviour was computed by averaging the responses to speeding behaviour reported on urban as well as open roads/highways. The measure was based on a 7-point likert scale of 1[*Never*] to 7[*Always*]. Higher scores indicated greater engagement in self-reported speeding behaviour. To measure message acceptance, a composite measure of intentions, similar to measures used elsewhere (e.g., Lewis, Watson, & Tay, 2007), was created from four items: participants reported the extent that they intended to obey and monitor the speed limit as well as the extent that they intended *not* to exceed the speed limit by more 10km/hr on urban and open roads/highways. The measure was based on a 7-point likert scale of 1 [*Strongly disagree*] to 7[*Strongly agree*]. Higher scores indicated stronger intention to not speed.

The Time 2 survey assessed speeding behaviour in the 4 week period since exposure to the advertising messages, with the same items used at Time 1.

Procedure

At Time 1, pre-exposure measures were first assessed then one message was randomly selected via computer-generation and played once only, and immediate post-exposure measures were subsequently assessed. At Time 2, participants were emailed the web address of the follow-up survey and completed the self-reported behaviour measure. The advertisements were not re-shown at Time 2. Responses to the two surveys were matched by a unique identifying code.

Results

The means, standard deviations, bivariate correlations, and alpha coefficients of the variables used are reported in Table 2. As expected, measures of past self-reported speeding behaviour reported at Time 1 were highly correlated with subsequent speeding behaviour reported at Time 2. Also as expected, intentions not to speed were significantly negatively correlated with speeding behaviour reported at both Times 1 and 2. The low means reported in relation to speeding behaviour at Time 1 and 2 indicates that participants in the current study reported engaging in speeding relatively infrequently.

Table 2
Means, standard deviations, bivariate correlations and (alpha coefficients)

Variable	M	SD	1	2	3
1. Past speeding behaviour at Time 1	2.35	.94	(.84)	-.55***	.78***
2. Message Acceptance	5.97	1.21		(.86)	-.55***
3. Speeding Behaviour at Time 2	2.38	.97			(.85)

Note. ***p<.001. Mean scores are based on 7-point scales (1 to 7). Higher message acceptance scores indicate a stronger intention not to speed. Higher speeding behaviour scores indicate more frequent engagement in self-reported speeding behaviour.

Regression analyses predicting speeding behaviour

A series of hierarchical multiple regressions were conducted to examine the extent to which message acceptance reported immediately following exposure to either a negative or positive emotional appeal predicted self-reported speeding behaviour engaged in the 4 weeks following exposure to the messages (i.e., Time 2), over and above that of past speeding behaviour reported prior to message exposure (i.e., Time 1). Thus, past speeding behaviour was entered as the predictor at step 1 of the model and message acceptance was entered as the predictor at step 2 of the model. Separate analyses were conducted for negative and positive emotional appeals[2] and for males and females.

Negative emotional appeals

Tables 3 and 4 provide the results of the hierarchical regressions predicting speeding behaviour in the negative appeals condition for males and females respectively. As shown in Table 3, step 1 of the regression analysis accounted for a significant 59.4% of the variance in speeding behaviour, $F(1, 39) = 55.54$, $p < .001$. Although the overall model at step 2 was significant, $F(2, 39) = 27.17$, $p < .001$, the addition of message acceptance at step 2 did not

[2] As noted previously, negative emotional appeals consisted of the results obtained for both the fear-based and agitation-based messages while positive emotional appeals consisted of results obtained for both the humour-based and pride-based messages.

add any significant additional variance in speeding behaviour, $F\Delta(1, 37) = 0.11$, $p = .745$. Past behaviour remained the only significant predictor at step 2, $\beta = .75$, $p < .001$. The results indicate that the most important and significant predictor of self-reported speeding behaviour for males following exposure to negative emotional appeals was past speeding behaviour.

Table 3
Predicting speeding behaviour for males in the negative appeals condition

Step and variable	B	β	R^2	ΔR^2
Step 1				
Past behaviour	.79	.77***	59.4***	
Step 2				
Past behaviour	.77	.75***	59.5***	.001
Message acceptance	-.03	-.04		

*** p< .001

Table 4 shows that, for females, step 1 of the regression analysis accounted for a significant 61.5% of the variance in speeding behaviour, $F(1, 59) = 94.32$, $p < .001$. With message acceptance added at step 2, an additional 4.3% variance in speeding behaviour was accounted for which was significant, $F\Delta(1, 58) = 7.37$, $p = .009$. At step 2, both past speeding behaviour and message acceptance were significant predictors, ($\beta = .70$, $p < .001$, $\beta = -.23$, $p = .009$, respectively). The results indicate that for negative emotional appeals both past behaviour as well as message acceptance are significant predictors of self-reported speeding behaviour for females.

Table 4
Predicting speeding behaviour for females in the negative appeals condition

Step and variable	B	β	R^2	ΔR^2
Step 1				
Past behaviour	.72	.78***	61.5***	
Step 2				
Past behaviour	.64	.70***	65.9***	.04**
Message acceptance	-.22	-.23**		

*** p< .001, ** p < .01

Positive emotional appeals

Tables 5 and 6 provide the results of the hierarchical regressions predicting speeding behaviour in the positive appeals condition for males and females respectively. As shown in Table 5, for males, step 1 of the regression analysis accounted for a significant 60.2% of the variance in self-reported speeding behaviour, $F(1, 21) = 30.30$, $p < .001$. With message acceptance added at step 2, an additional 20.2% variance in self-reported speeding behaviour was accounted for, which was significant, $F\Delta(1, 19) = 19.69$, $p < .001$. Although past behaviour was significant predictor at step 1, it no longer remained significant at step 2, $\beta = .25$, $p = .130$. Message acceptance represented the most important and only significant predictor of self-reported speeding behaviour at step 2, $\beta = -.69$, $p < .001$. The results indicate that message acceptance reported following exposure to positive messages was the most important predictor of self-reported speeding behaviour for males.

Table 5
Predicting speeding behaviour for males in the positive appeals condition

Step and variable	B	β	R^2	ΔR^2
Step 1				
Past behaviour	1.08	.78***	60.2***	
Step 2				
Past behaviour	.34	.25	80.5***	20.2***
Message acceptance	-.62	-.69***		

*** p< .001

Table 6 shows that, for females, step 1 of the regression analysis accounted for a significant 58.6% of the variance in self-reported speeding behaviour, $F(1, 71) = 100.43$, $p < .001$. Although the overall model at step 2 was significant, $F(2, 72) = 49.81$, $p < .001$, the addition of message acceptance at step 2 did not add any significant additional variance in speeding behaviour, $F\Delta(1, 70) = 0.25$, $p = .618$. Past behaviour remained the only significant predictor at step 2, $\beta = .74$, $p < .001$. The results indicate that the most important and significant predictor of self-reported speeding behaviour for females following exposure to positive emotional appeals was their past speeding behaviour.

Table 6
Predicting speeding behaviour for females in the positive appeals condition

Step and variable	B	β	R^2	ΔR^2
Step 1				
Past behaviour	.76	.77***	58.6***	
Step 2				
Past behaviour	.73	.74***	58.7***	.001
Message acceptance	-.04	-.05		

*** p< .001

Discussion

This study had two main aims. The first aim was to examine whether anti-speeding advertising messages were able to influence speeding behaviour over and above the influence of past speeding behaviour. The second aim was to determine whether the type of emotional message (i.e., positive or negative) and the gender of the respondent influences the extent to which the advertising messages are able to influence speeding behaviour over and above the influence of past speeding behaviour. The results of the study suggested that advertising messages can influence subsequent speeding behaviour over and above the influence of past speeding behaviour. However, the effect of advertising messages may depend on whether it is a positive or negative emotional appeal as well as the gender of the respondent. Moreover, the manner in which positive and negative emotional messages were found to affect male and female respondents was consistent with the study's predictions.

For males, message acceptance reported in response to the positive messages predicted subsequent speeding behaviour over and above past speeding behaviour by a further 20.2%, thus supporting Hypothesis 1a. Moreover, with message acceptance entered into the analysis, past behaviour was no longer a significant predictor of subsequent behaviour. Thus, not only explaining additional variance in subsequent behaviour beyond the variance explained by past behaviour (as predicted), message acceptance also appeared to mediate the effects of past speeding behaviour on subsequent speeding behaviour. The finding should be of particular

significance in the road safety advertising context as it suggests that an advertising message was able to influence (in a desired manner) the future speeding behaviour of males: a key high risk road user group who typically have been shown not to be persuaded by traditional fear-based approaches (Lewis et al., 2007; Lewis et al., in press). The inability of fear-based approaches to persuade males' was also supported in the current study. Specifically, in relation to the influence of negative messages on males, message acceptance reported in response to such messages did not predict subsequent speeding behaviour over and above past speeding behaviour, thus supporting Hypothesis 1b. Moreover, past speeding behaviour was the only significant predictor of subsequent speeding behaviour when both predictors were entered in the model. The results indicate that the measure of an advertising message's effectiveness, message acceptance, does not influence behaviour. Although the predictive capability of past speeding behaviour for future speeding behaviour may hold for males following exposure to negative emotional messages, it appears that positive emotional appeals are able to produce an additional influence.

In contrast, and as predicted, the results for females were opposite of those found for males. Specifically, for negative messages, message acceptance significantly predicted subsequent speeding behaviour over and above past speeding behaviour, thus providing support for Hypothesis 2a. Of note, however, was the finding that past speeding behaviour remained a significant predictor together with message acceptance. Of the two predictors, past speeding behaviour had a larger beta weight than message acceptance indicating that past behaviour was a relatively stronger predictor than message acceptance. This finding attests to the pervasive influence of past behaviour on future action. While not inconsistent with Hypothesis 2a, in that the findings indicate that the negative appeals did significantly influence self-reported speeding behaviour, it appears that females' past behaviour remains a strong predictor of their subsequent speeding behaviour. In relation to the positive messages, message acceptance reported by the female respondents did not predict subsequent speeding behaviour over and above past speeding behaviour; in fact, past behaviour was the only significant predictor of subsequent speeding behaviour. This finding supports Hypothesis 2b. Thus, similar to the limited persuasive effects reported in response to the negative emotional appeals for males, the positive emotional appeals demonstrated limited persuasive effects for females. The contrary findings for females and males in the positive emotional appeals further highlights the potential utility of positive emotional messages for targeting male road users.

Strengths, limitations, and future research

The study provides valuable insight for road safety advertising research and practice. A notable strength of the study was the inclusion of follow-up measures of speeding behaviour. Providing evidence that advertising messages may influence subsequent behaviour reported 4 weeks after exposure to a message highlights that advertising messages can impact upon behaviour and that the persuasive effect of an advertising message may extend beyond immediate post-exposure measures. The study, therefore, highlights the importance of including follow-up measures within studies of persuasion. Additionally, the study has highlighted the need for advertising practitioners to at least consider the potential utility of positive emotional messages. In an advertising context where fear-based negative emotional approaches have dominated (Tay, 2002), the current study has identified a possible alternative emotional approach that may be persuasive for males. The study has also highlighted the importance of focusing advertising efforts on modifying intentions and not just attitudes. As such, the current study supports the view espoused by other researchers (e.g., Elliott et al., 2003; Mann & Sullman, 2008) that advertising countermeasures may be better focused at

breaking habits and, thus, should focus on behaviour and a most proximal determinant of behaviour, intentions.

The current study also has limitations that need to be acknowledged. One limitation of the study would relate to the small sample size particularly in relation to males in the positive emotional appeals condition. Replication of this study's results with a larger sample of males would provide important validation of the current findings. An additional limitation of the study relates to the reliance upon self-reported measures of behaviour. In an applied context such as road safety, it is especially important for advertising researchers to measure outcomes of practical significance. Although, it is important to note that previous research has demonstrated that self-reported speeding measures do provide an accurate reflection of covertly-measured actual speeds (Hagland & Åberg, 2000). A final limitation relates to the fact that the study was based upon anti-speeding messages only. Given previous evidence that has indicated that risky driving behaviours, such as speeding and drink driving, may require different advertising approaches (see Tay, 2005), there is a need to examine whether the effects found in relation to anti-speeding messages generalise to the advertising of other risky driving behaviours.

Conclusion

The current study tested the efficaciousness of emotional messages for motivating behaviour change in relation to speeding. The results have identified conditions under which such messages may influence subsequent speeding behaviour. The results have highlighted the important moderating role of gender in influencing the relative effectiveness of positive and negative emotional messages. Additionally, and perhaps most significantly, the findings have highlighted the potential effectiveness of positive emotional appeals in modifying the speeding behaviour of male drivers.

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